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SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said James Heddle in the Great Seal Patent Office on the 11th November 1870.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES HEDDLE, of Leith, in the County of Mid Lothian, North Britain, Merchant, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Thirteenth day of May, in the year of our Lord One thousand eight hundred and seventy, in the thirty-fourth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said James Heddle, Her special licence that I, the said James Heddle, my executors, administrators, and assigns, or such others as I, the said James Heddle, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN PREPARING, CLARIFYING, AND PRESERVING VEGETABLE JUICES AND OTHER LIQUIDS," upon the condition (amongst others) that I, the said James Heddle, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said James Heddle, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement in writing, that is to say:—

My said Invention has for its objects the better preparing, clarifying, and preserving of vegetable juices and other liquids, such as lime and other fruit juices, wines, malt liquors, cordials, and saccharine, or other vegetable or organic solutions, and consists in using for those purposes the following agents, singly or in combinations with one another, or with other substances, namely, silica, hydrochloric acid, potassium, tannin,

olein, essential or aromatic oils, oils containing sulphur, glycerine, nitrites, hyponitrites, hyponitrates, and hyposulphites.

And in order that my said Invention and the manner of performing the same, may be properly understood, I shall now proceed to particularly describe the modes in which I prefer to practise it, premising that I do not restrict myself to the precise proportions of the agents herein-after recommended nor to the precise details herein-after referred to.

For the purpose of clarifying or preparing liquids by removing gummy, extractive, or cellular matter, and thereby at the same time rendering the liquid less liable to decomposition, I use preparations of silica, preferably the soluble silicates, as of potassium or sodium, which I add at the rate of from one to two pounds of silicate to every hundred gallons of liquid to be clarified. If required as in non-acid compounds, hydrochloric, citric, or other suitable acid may be employed to set free the silica. After filtering or decanting it will be found that the silica will have caused the separation of mucilaginous matter in solution, through insoluble combination of the same, with the silica employed, and the clarification of the liquid by mechanical inclusion and subsidence of previously floating and suspended matter in the liquid operated upon. The soluble silicates are to be preferred in the clarifying and preserving of vegetable juices to the argillaceous bodies, sometimes used for the purpose of clarifying, as such argillaceous bodies from being largely absorbent of oily matter remove too much of this principle which performs a very important part in the natural and artificial preservation of vegetables and other organic liquids and substances.

In liquids in which the gluten present has a tendency to undergo the putrefactive decomposition, I use a minute proportion of hydrochloric acid by preference in the form of potassium chloride, say in the proportion of one-eighth to one-half per centum of the liquid operated upon, whereby the decomposing action is prevented or retarded.

Tannin in its various forms, I use where for clarifying liquids, preparations of isinglass, or like albuminous bodies are employed, and where the presence of such bodies (as in liquids of weak antiseptic character) endangers the preservation of the liquid. The effect of this body, tannin, is to increase the clarifying action of the other bodies used, as the albuminous or gelatinous substances are soluble in acid juices and are thereby rendered less susceptible of coagulation or

contraction. This is counteracted by the tannin, whilst any tanno-gelatine or the like remaining in solution is much more stable and less liable to decomposition. The use of the important vegetable principle, tannin, is also of itself desirable and of great value in many cases on dietetic grounds, owing to its corrective effects where too free or continuous a use is made of lemon, lime, or other juices, as at sea, and in warmer climates. One to two ounces of tannin to every hundred gallons of liquid is sufficient to determine clarification by the separation of the gelatinous or albuminous substances when these are used in ordinary or reasonable proportions.

I add olein or an essential or aromatic oil of antiseptic character, or an oil containing sulphur, to clarified lime or other vegetable juice to preserve it from the action of the air. Olein is superior to olive oil sometimes used for this purpose on account of its greater fluidity and as it differs by the removal of those constituents of olive oil which conduce to its becoming rancid. About four ounces of olein should be added to every hundred gallons of the liquid operated upon. The essential or aromatic oils, such as oil of mustard seed, oil of cloves, and oil of santalwood, are to be taken as alcoholic or ethereal solutions, or as infusions or tinctures of the seeds or herbs yielding them, and to be mixed in that form with the juice. About one ounce of essential or aromatic oil is sufficient for each hundred gallons of the liquid operated upon.

Glycerin, either alone or combined with hydrochloric, acetic, or other suitable acid may be added to the clarified juice as a preservative. It is also of use as a menstruum to prevent the injurious effect of much free acid, and for this purpose may be added in any proportion, whilst as a preservative it should equal in bulk the liquid with which it is mixed.

Nitrites, hyponitrites, hyponitrates, and hyposulphites I use on account of the tendency which they are known to chemists to possess to become converted to nitrates or sulphates by taking up free or loosely combined oxygen. In consequence of this tendency they fix or render inactive oxygen which might otherwise cause the decomposition of constituents of the liquids to which they are added through exposure to or contact with the air. One-third of a pound may be added to every hundred pounds of the liquid treated, or a solution of specific gravity 1080 (water being 1000), may be formed, and one per centum thereof by

measure be added to the liquid. In cases where alcohol or other antiseptic is used or present a much less proportion of the salt will suffice. I add these agents to vegetable juices, to wines, malt liquors, or fermentable beverages of any kind, for the purpose of preserving them by preventing acetous or putrefactive fermentation. Potassium salts or compounds are to be used in preference to the combinations of the same acids with other bases, as sodium or calcium. All the combinations of sulphur and oxygen with sodium are nauseous and therefore unfit for use in potable liquids in quantity sufficient to act as preservatives, whilst the calcium combinations are unsuitable because they are certain, in time, to cause deposits, and because the calcium salts of organic acids, as has been stated by Liebig, exhibit a tendency in the combined acid to decompose even in the case of many organic acids which do not decompose by themselves.

It may also be noticed that as skilled physicians consider that the potassium naturally existing in lime and lemon juices contributes largely to the beneficial medicinal effects of those juices, a small addition of that base may be expected to enhance those effects.

Having thus particularly described my said Invention and the manner in which the same is to be performed, I have to state that what I believe to be novel and original, and claim as secured to me by the herein-before in part recited Letters Patent is,—

1. The preparing and clarifying of vegetable juices and other liquids by means of silica and its combinations excepting argillaceous silicates, in the manner herein-before described.

2. The using of potassium chloride to prevent decomposition in liquids containing gluten as herein-before described.

3. The preserving and clarifying of vegetable juices by means of tannin as herein-before described.

4. The adding of olein or an essential or aromatic oil of antiseptic character, or an oil containing sulphur, to vegetable juices, for the purpose of preserving such juices, in the manner herein-before described.

5. The mixing of glycerin with vegetable juices or other potable liquids for preserving or preparing the same as herein-before described.

6. The using of nitrites, hyponitrites, and hyponitrates for preserving vegetable and other juices as herein-before described.

7. The using of hyposulphites for preserving vegetable juices as herein-before described.

8. The substituting of potassium for sodium or calcium in antiseptic combinations used for preserving vegetable juices, wines, malt liquors, and other beverages, as herein-before described.

In witness whereof, I, the said James Heddle, have hereunto set my hand and seal, this Ninth day of November, in the year of our Lord One thousand eight hundred and seventy.

JAMES HEDDLE. (L.S.)

Witness,
EDMUND HUNT,
Patent Agent,
Glasgow.

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